

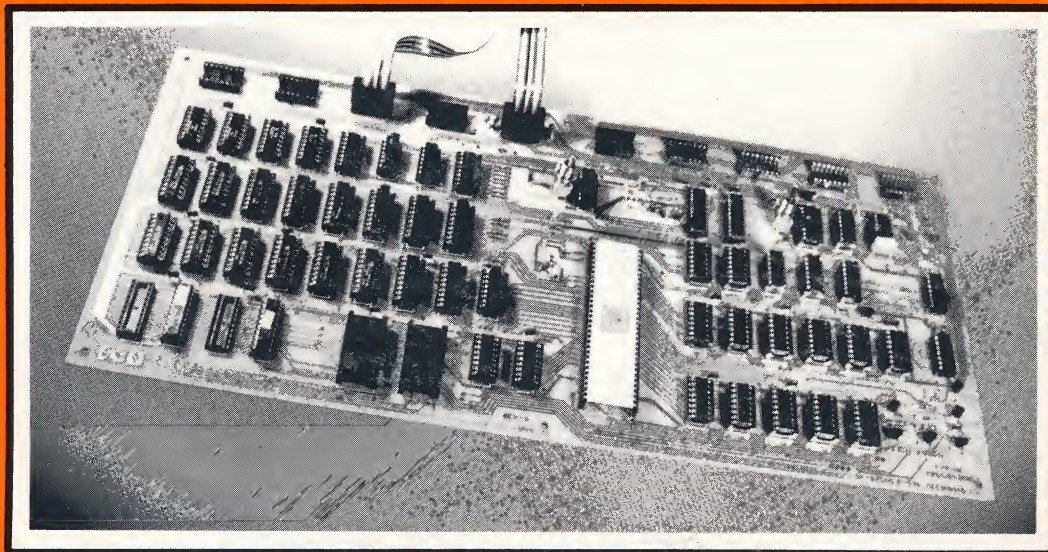
**TWO BYTES ARE
BETTER THAN ONE**

WCCF 97

**THE
TECHNICO**

SUPER STARTER SYSTEMTM

TEC-9900-SS



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INCLUDES: MONITOR, E-PROM PROGRAMMER, ADJUSTABLE RS232C AND 20 ma loop
7" x 16" P.C. Board has capacity to accept:

**2K BYTES EACH ON BOARD
PROM E-PROM RAM**

TMS-9900- 16 Bit Microprocessor features:

- 16-bit instruction word
- 8 and 16-bit data format
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- Parallel 15-bit address bus directly addresses 32K words or 64K bytes
- Advanced memory-to-memory architecture that places multiple register files in memory
- Same software as TI 8 Bit and 4 Bit micro's
- 69 instructions, including multiply and divide with 7 addressing modes
- 16 general purpose registers per file
- Easy to interface with slow memories
- TTL compatibility

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DESIGN AND TECHNICAL SUPPORT BY ROSSE CORP.

**ASSEMBLED
TEC-9900-SS-A**

\$399

BASE OPERATING SYSTEM: (TEC-9900-SS)

The Super Starter 3/8" x 7" x 16" P.C. board is laid out for a full 2K BYTES each of PROM, E-PROM, and RAM. In the basic price of the system you receive only 1K BYTES of PROM, which is the monitor and 512 BYTES of RAM. Approximately 50 BYTES of RAM are used for the TMS 9900 REGISTERS. You may order additional PROM, E-PROM, and RAM to bring the board up to its full 6K capability. The board includes E-PROM Programmer circuitry including RS232 and 20 ma current loop and all other circuits including TMS 9900 CPU as Shown on Back Page. The board is fully socketed. Kit Includes All Documentation.

POWER AND SPEED CHARACTERISTICS:

Voltage	+5	-5	+12	+28
Amps-Base system	1.2A	300ma	-300ma	200ma
Amps-with complete Memory Board Add On	5.0	1.0	+3A	200ma

TEC-990-PP provides enough power for CPU plus 65KB of memory. The Board uses full spec TMS-9900 and will operate up to 3.3 MHZ with a full Spec 9904 Clock. With 74LS362X maximum Speed 2.5 mHZ, A 16 x 16 Multiply takes Approx. 20 micro/sec.

BUS STRUCTURE

Super starter universal bus consists of 10-16 Pin I-C Sockets interconnected by Flat flexible cable. Conversion to other boards is made using 16 conductor cable and 16 position dual in-line connectors. Since no Mother Board is required, the System will operate inside or outside a chassis. A chassis is **not** required for operation.

MEMORY EXPANSION BOARD (TEC-9900-MA-KB)

The Dynamic memory board is 7" x 16" with Super Starter Universal bus. Board has 32K Byte capacity and is available populated in multiples of 8K Bytes from 8KB to 32KB. Two boards may be interconnected to provide a full 65K Byte mini-computer. The board incorporates 18 pin 4K by 1 dynamic memory chips with 450 ns. access time. Complete refresh circuitry is included and operated in a transparent mode which does not require any interruption of the processors normal cycle time. The memory can function as either 8 Bit or 16 Bit memory by use of relocatable jumpers. The Board is also easily modified to accept 4K by 1 Statics.

Compatible Peripherals: Through the RS232 and 20 ma loop under control of the monitor, the Super Starter board is adjustable with an on-board pot to communicate with peripherals from 110 to 1200 BAUD.

VIDEO-AUDIO BOARD (TEC-9900-VA)

The Video-Audio board is a 7" by 16" P.C. Board with Super Starter universal bus structure. It features a T.V. interface with composite video output. The screen organization is approximately 40 characters by 29 lines. The board includes an audio cassette interface and is setup to accept ASCII encoded parallel keyboard input which is 7 data bits and 1 strobe bit. Additional optional RAM memory for the T.V. interface allows either standard character generation or limited graphics from 3K bytes of erasible E-PROM (2708). Additional options include software controlled hardware single step circuit.

WARRANTY:

180 Day Limited Warranty is fully described in our Documentation Manual.

TECHNICO ALSO STOCKS:

The Texas Instruments 990/4 minicomputer and software development system, Memories, IC's, Wire and Cable, Wire-wrap Boards, Digital Support components, Texas Instruments Terminals and Printers.

DOCUMENTATION AND PROGRAMMING:

The TEC-9900-SS comes with a complete 175-page manual and schematics. An additional self-study book on 9900 programming is available. It is estimated that programs of over 1.5K Bytes in 8080A language will take less memory with the 9900 mini-computer instruction set. NO NEED TO PROGRAM IN HEX. SEE BELOW.

INSTANT INPUT ASSEMBLER® (TEC-9900-IIA)

The Instant Input Assembler offers most standard assembler features, except labels. The unique difference is that it accepts input from the operator terminal and immediately translates it to machine code. NO NEED to edit and punch the tape first. The assembler is delivered in two fused link PROMS (2-74S472), ready to be plugged into the existing PROM area of the Super Starter System. In addition, you will receive complete user documentation and a source listing of the amazing 512 word Instant Input Assembler.®

MIGHTY MONITOR FEATURES®

The Super Starter System has preprogrammed 1KBYTES of fusable link P-Prom which contains a powerful monitor. The monitor's capabilities are summarized below: (Included in base system in 2-74S472's)

- Variable RS-232C/ TTY Baud Rates
- ALTER MEMORY: modify selected RAM locations
- BREAKPOINT: set a software breakpoint in RAM
- COPY: move one area of memory to another
- DUMP: dump memory on terminal device
- GO: transfer control to a user program
- HEX: perform hexadecimal arithmetic
- LOAD: reload recorded dump of memory
- MODIFY CRU: modify the state of individual input/output bits
- INSPECT CRU: inspect the state of individual input/output bits
- PROGRAM: program TMS 2708 E-PROM or TMS 2716 with modification
- SNAP: display registers of memory in an executing program without operator intervention
- WORKSPACE DUMP: display user registers

Fully documented source listings are supplied.

DEVELOPMENT LEVEL SOFTWARE:

Complete Editor and assembler is available on digital cassette or paper tape and can be loaded through the RS-232 Interface. Audio Cassettes can be loaded through the visual-audio board. It takes approximately 16KB of Memory Space. User Programs require additional memory. Programs of under 1.5K words can be assembled and edited a line at a time using the Super Starter System Instant Input Assembler and the Video-Audio Board (TEC-9900-VA). The entire program can be stored in Ram, scrolled onto a TV monitor, edited, permanently stored in E-PROM or on audio cassette; thereby reducing the need for Hard copy. Programs can also be loaded into the Super Starter System from the T.I. 990/4 mini-computer.

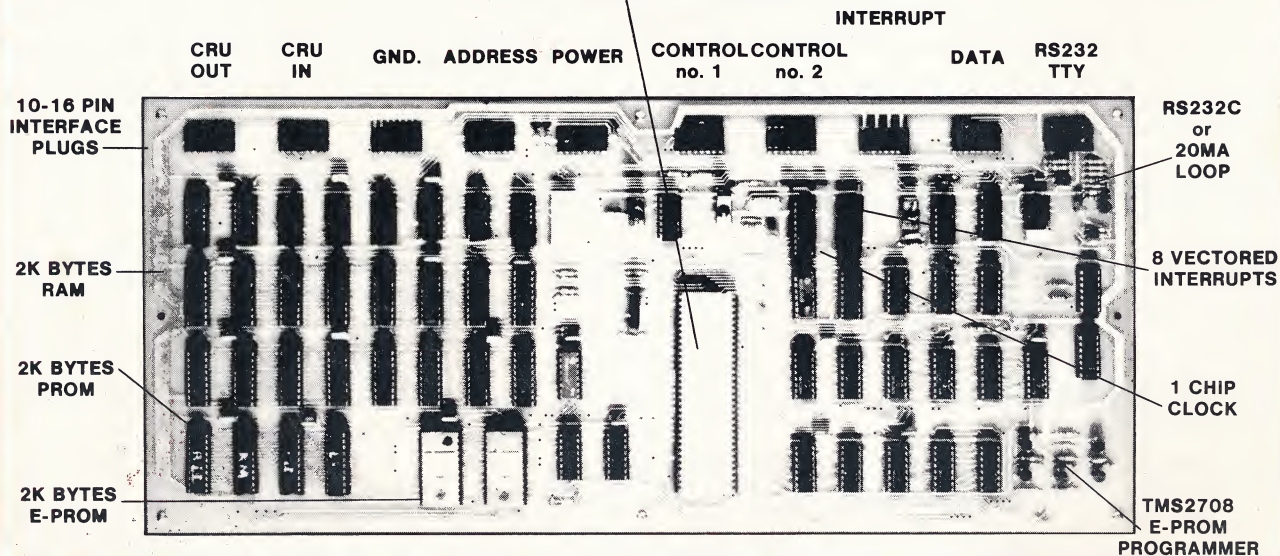
HIGHER LEVEL LANGUAGES:

9900 Super Basic which is an interpretive compiler contains the standard basic instructions, plus extended functions. Also includes floating point double precision. It is available on paper tape, Digital or Audio Cassette. It is also available resident in E-PROM. The basic runs in approximately 6K words and functions 1,000 to 4,000 times faster than 8080A interpreter type basic.

A Fortran interpreter will be available the 4th Quarter, 1977. Applications programs will be available with the TR-9000-SS.

TECHNICO SUPER STARTER SYSTEM®

TMS 9900
16-BIT MICROPROCESSOR



EXPANDABLE TO A
COMPLETE MINI-COMPUTER SYSTEM
THE
TECHNICO/ROSSE
TR SUPER STAR
TR-9900-SS

P/N	DESCRIPTION	P/N	DESCRIPTION
*1)	TEC-9900-SS-BASE CPU	*9)	TEC-9900-MK-MECHANICAL KEY BOARD
*2)	TEC-9900-MA-16KB-16KBYTES OF MEMORY	□ 10)	TEC-9900-EP-E-PROM CARD
△3)	TEC-9900-FDC-FLOPPY DISK CONTROLLER	□ 11)	TR-9000-CH CHASSIS with LIMITED FRONT PANEL
△4)	TEC-9900-FDD/2-DUAL FLOPPY DISK	△ 12)	TR-9000-CWF CHASSIS with FULL FRONT PANEL
*5)	TEC-9900-PP-POWER SUPPLY	° 13)	TR-900-CRT -CRT PERIPHERAL
△6)	TEC-9900-AIO-INTERFACE BOARD	△ 14)	TR-9000-LSP-LOW SPEED PRINTER
*7)	TEC-9900-VA-VIDEO-AUDIO INTERFACE	△ 15)	TR-9000-HSP-HIGH SPEED PRINTER
*8)	TEC-9900-RK-REED KEYBOARD		

DISTRIBUTED BY:

*Available Now
□ 2nd Quarter '77
△ 3rd Quarter '77
° 4th Quarter '77

TR SUPER STAR SYSTEMS
TRPKG-1 WITHOUT PERIPHERALS
INCLUDES: 1,2,3,4,5,6,11

TRPKG-2 WITH PERIPHERALS
INCLUDES: 1,2,3,4,5,6,11
13,14 or 15